

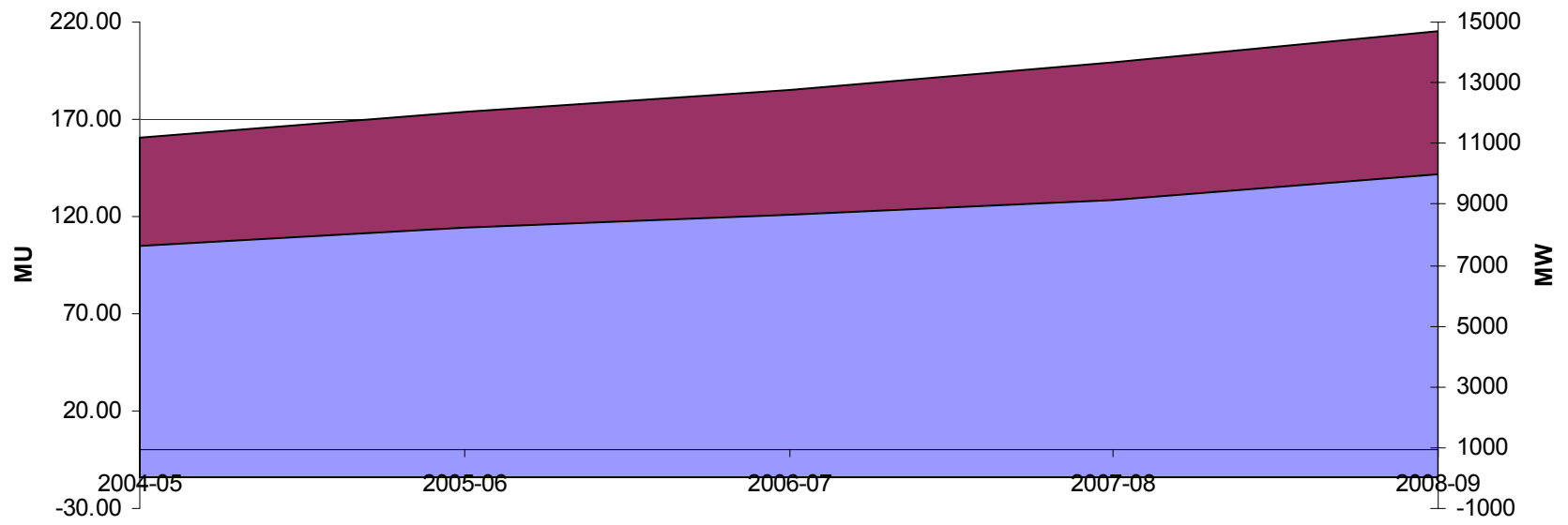
NETWORK CAPACITY IMPACT ON COMPETITIVE MARKET OPERATION

ATLURI. KAMESH

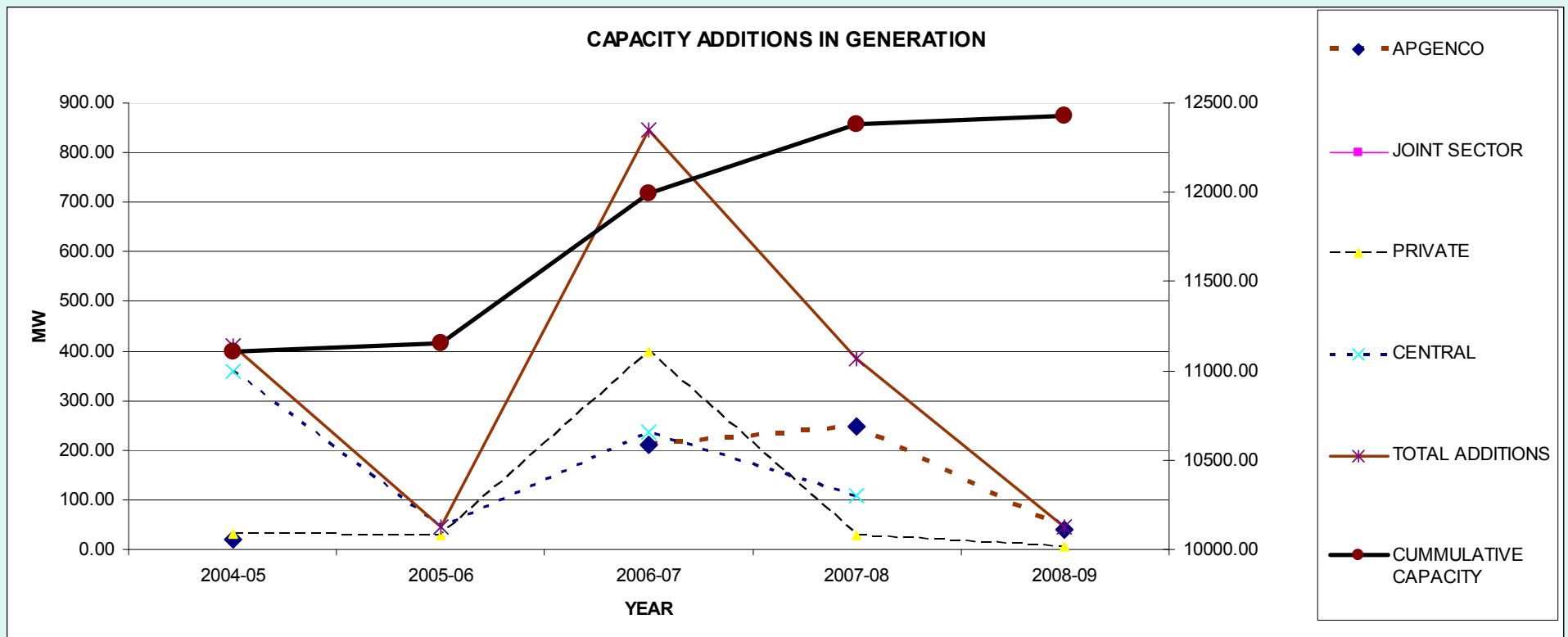
BE(Elect), MS(PS),MBA,PGDENM

Divisional Engineer,APCPDCL

PROGRESS OF AP POWER



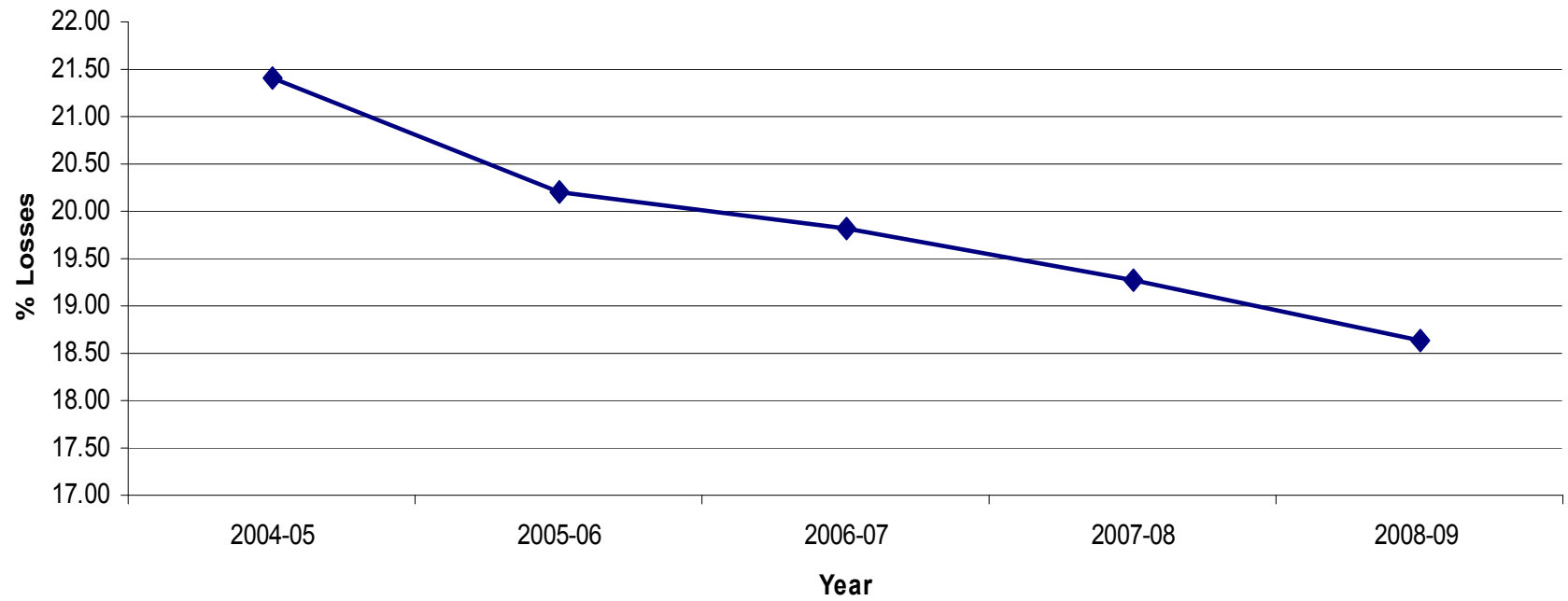
CAPACITY ADDITIONS IN AP



Year wise No. of consumers, Sales and Revenue

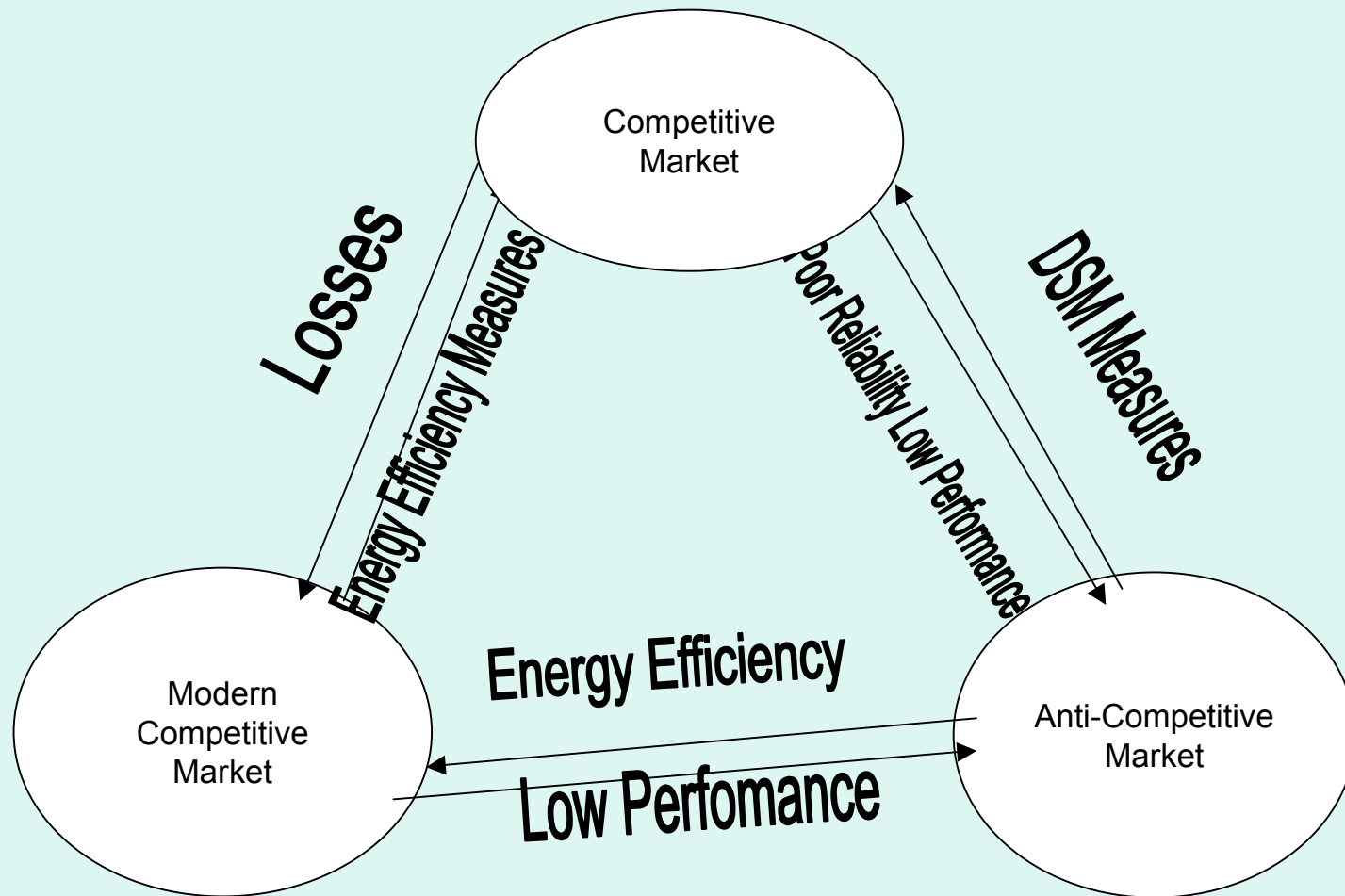
Year	LT			HT			Total		
	No. of Consumers	Sales (MU)	Revenue (Rs. Crs.)	No. of Consumers	Sales MU)	Revenue (Rs. Crs.)	No. of Consumers	Sales (MU)	Revenue (Rs. Crs.)
2004-05	16542180	26440	4402	5842	11178	4169	16548022	37618	8571
2005-06	17315533	27345	4206	6392	12307	4669	17321925	39652	8875
2006-07	18370809	30765	4806	7220	14084	5192	18378029	44849	9998
2007-08	19464931	31356	5540	8376	16551	6066	19473307	47907	11606
2008-09	20671328	33971	6680	9711	18268	6866	20681039	52239	13546

Year wise T&D losses in AP



Electricity market in Andhra Pradesh

- Competitive market
- Moderately competitive Market
- Anti-Competitive



• Capacity	Range of Specific Revenue(Rs/Unit)	Market Interpretation
• Adequate	> 3	Competitive
• Adequate	>2<3	Moderately Competitive
• In Adequate	<2	Anti-Competitive

Electricity market in AP

1. Agricultural Sector
2. Lighting Sector
3. Industrial Sector

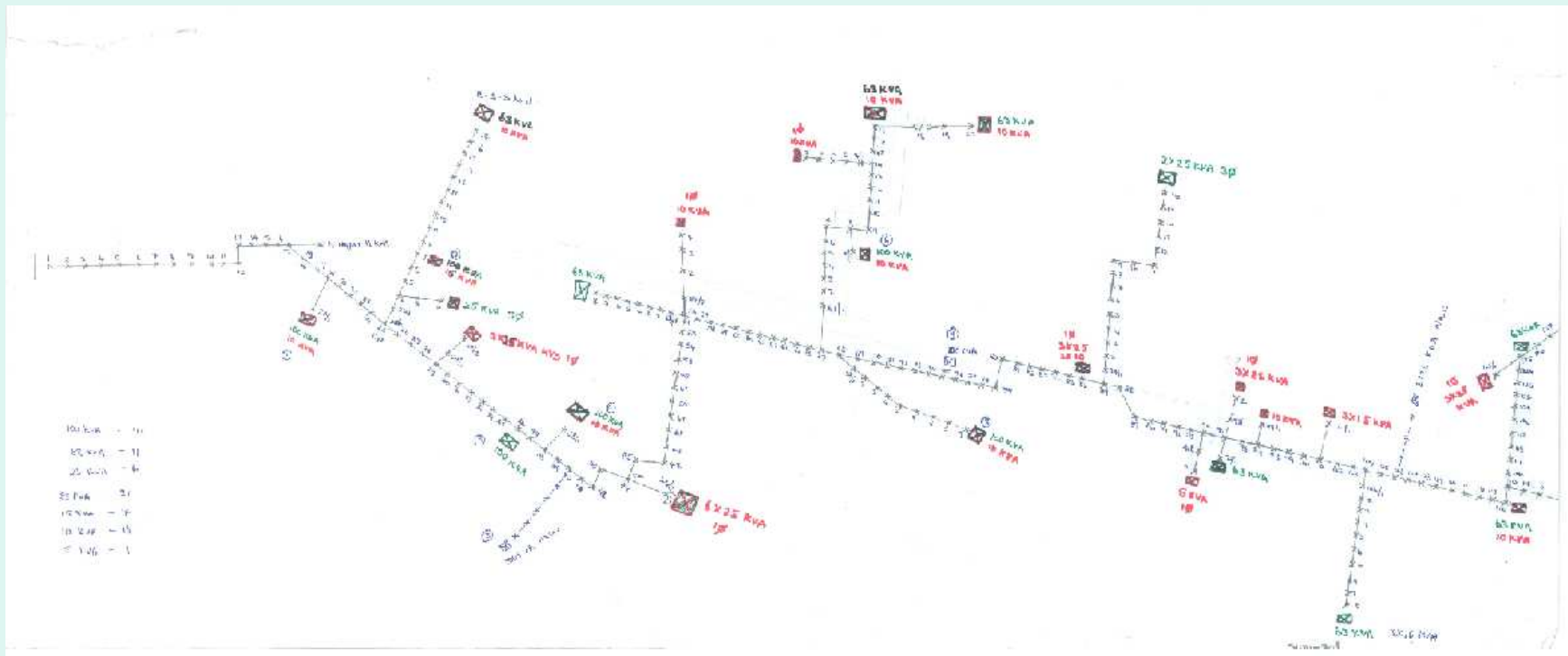
Case study

An 11 KV feeder of predominant agriculture sector is considered as a unit

Input parameters

- Peak load Amps during a study period
- Energy sent out in the feeder during the study period
- Connected load (Capacity of all individual DTR's) on the concerned feeder.
- No. of category wise consumers with their connected load.
- Capacity with full load losses of DTR's connected on the feeder
- The size of the 11 KV conductor & its resistance.
- Distance of the feeder in KM
- PF recorded during the study period.
- Revenue demand.
- Availability of land and water table
- MRI DATA

FEEDER SKETCH



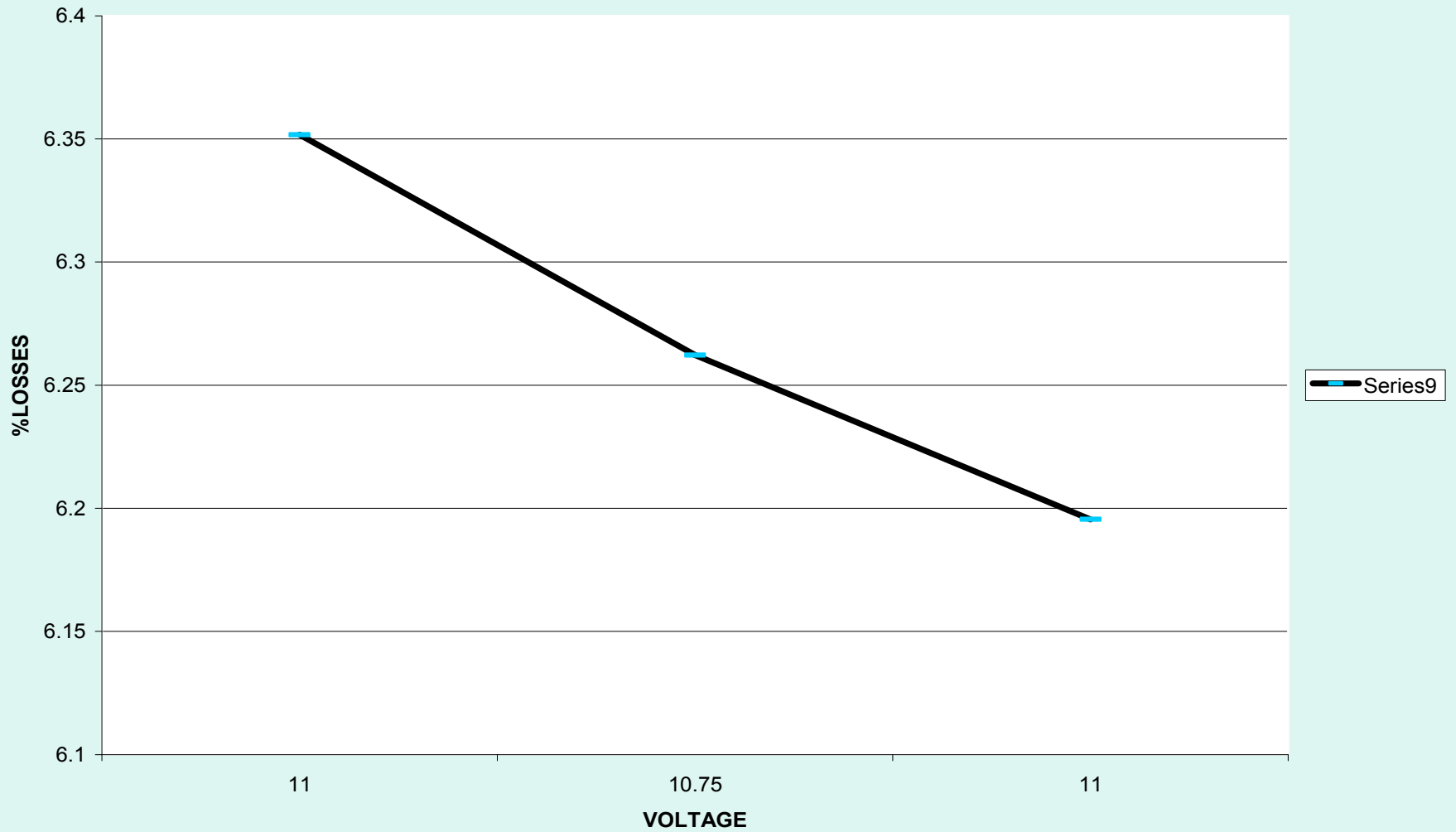
- **Methodology for Calculation of technical losses during the agriculture supply**
- Technical losses of feeder during power supply to Agricultural Sector
- And calculation of the segregated Agricultural consumption.
- The expected capacity due to loss reduction is also evaluated

METHODOLOGY

• Energy Sent out in Feeder	:	E (from CMRI meter data of a Day)
• Maximum load in amps	:	P Amps
• Connected Load (CL)	:	Cumulative Maximum Loads from each
• Diversity Factor(DF)	:	CL / 1.732×V×P)
• Period supply =7	:	H = Hours of AGL
• Load Factor	:	LFAGL = E/1.732 × V × P × PF ×H
• Load Loss factor	:	LLFAGL = 0.8 × (LFAGL) 2 + 0.2 × LFAGL
• Cumulative Capacity	:	KVA
• A	:	A=(KVA/ (V × DF)) 2 × L × R/1000
• Energy loss in the feeder during the study Hourls L1	:	L1 = A× LLFAGL ×HRS
• Energy Loss in DTR's During Hourly Loss	:	:L2 = No load losses +(KVA / KVA Rated)^2x Full Load
• Total Energy Loss	:	B = L1+L2 KWH
• Input to feeder	:	C = (1.732 ×V×P×PF)+A
• Energy Sent out	:	D = C × LFAGL × H
• Percentage of HT line loss(L)	:	L = B × 100 / D

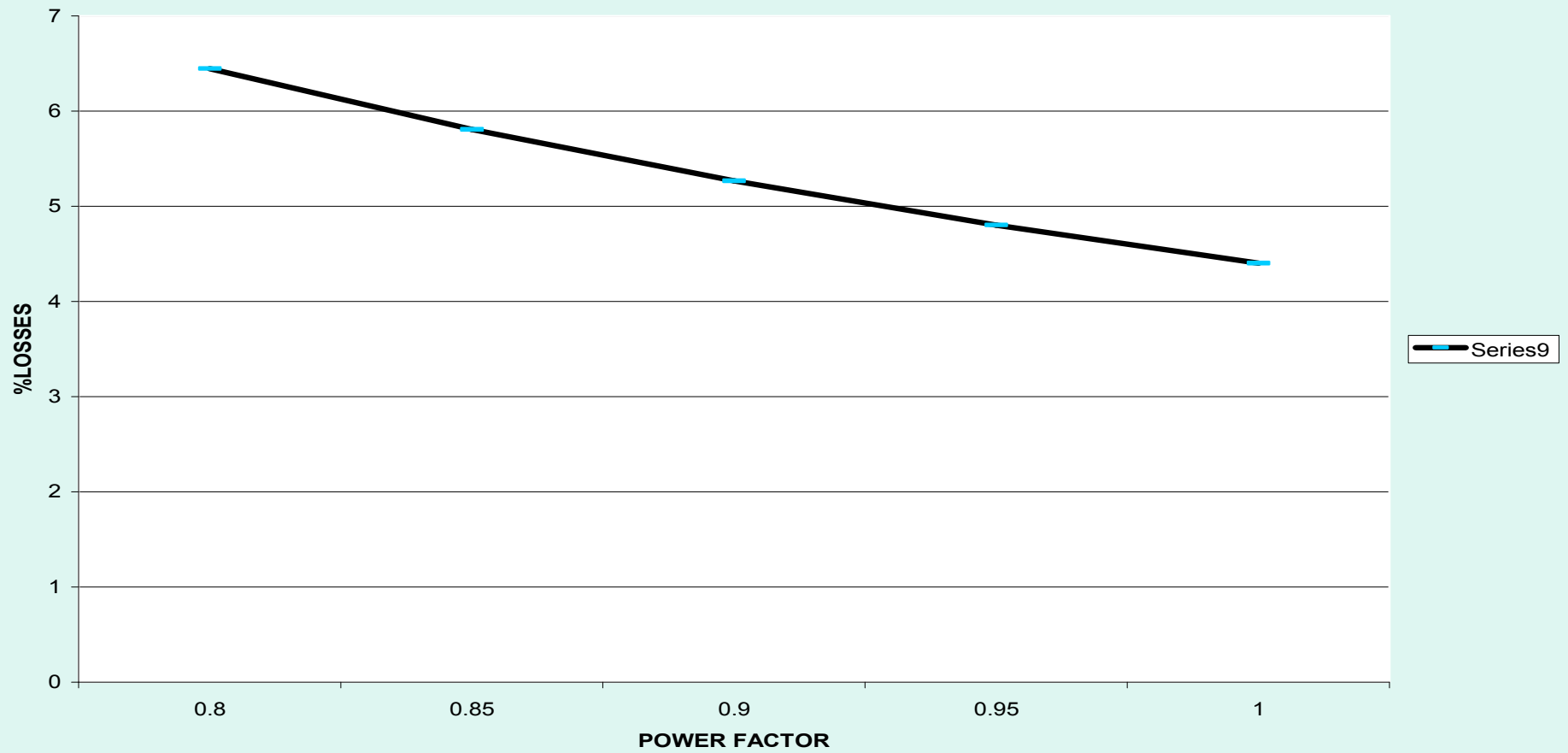
RESULTS

DAY CHART VOLTAGE Vs %LOSSES



RESULTS

DAY CHART PF Vs %LOSSES



- $E_{AGL} = LF \cdot (1.732 \cdot V \cdot P \cdot PF) \cdot H - B = 9971.90758 \text{ Units}$

Reactive power management Calculations

KVAR REQUIRED= $kw*(\tan\phi_1-\tan\phi_2)$ 1362.43027

new KVA after adding Capacitor
 $=\frac{KVA*old\ PF}{new\ PF}$ 2178.52632

Expected KVA reduction after adding Capacitor
 $=KVA-(\frac{KVA*old\ PF}{new\ PF})$ 408.473684

percentage reduction of KVA 84.2105263

reduced load on feder with PF improvement 114.346332

No of AGL services under SS= 3337

No units saved by PF imp= 199.472714

Cost of saved units in a month= $3.2*No\ of\ units\ saved*30$ **19149.4**

Cost of saved units per serv in a for 287 AGL serv month= 66.7225803

cost of saved per each group of AGL serv=Total
 $\frac{serv}{2}*287.724878$ 111326.625